

From East Limb.	From West Limb.	Sum.
18''7	23''9	42''6
18.7	24.5	43.2
17.6	23.5	41.1

Mean = 42''3; differences +0.3, +1.1, -1.2.

1896 April 26 : Shadow of I. in transit ; ingress, 6^h 27^m ; egress, 8^h 47^m. Position angle 104°1.

When nearly central (but on east side of central meridian) the following measures were made :—

Distance from North Pole.	Distance from South Pole.	Sum.	Differences.
18''0	16''9	34''9	-0''5
18.0	17.0	35.0	-0.4
18.4	17.0	35.4	0.0
18.2	17.3	35.5	+0.1
18.4	16.9	35.3	-0.1
18.8	16.9	35.7	+0.3
18.8	17.0	35.8	+0.4
18.8	17.1	35.9	+0.5
18.4	16.6	35.0	-0.4
18.9	17.0	35.9	+0.5

Mean = 35''4.

The shadow was central about 7^h $\frac{1}{2}$. It moved along the bright central zone at a distance of 1''4 from the north edge of the ruddy double band just south of *Jupiter's* equator.

Observations of Phenomena of Jupiter's Satellites with the 9 $\frac{1}{8}$ -inch Cooke Equatorial Refractor at Mr. Crossley's Observatory, Bermerside, Halifax, in 1895-6. By Joseph Gledhill.

Day of Obs.	Satellite.	Phenomenon.	Phase.	G.M.T. of Observation.	G.M.T. of <i>N. Almanac.</i>
1895.				h m s	h m s
Oct. 29	I.	Ec. D.	Fading	15 6	15 7 19
			Bisection?	15 7	
			Just gone	15 7 40	
	II.	Ec. D.	Fading	16 35	16 35 58
			Bisection?	16 36	
			Just gone	16 36 50	
Nov. 30	I.	Ec. D.	Fading	11 34	11 36 16
			Bisection?	11 35	
			Just gone	11 36 41	

490

Mr. Gledhill, Observations of

LVI. 9,

Day of Obs.	Satellite.	Phenomenon.	Phase.	G.M.T. of Observation.	G.M.T. of <i>N. Almanac.</i>
1895.				h m s	h m s
Dec. 1	IV.	Ec. R.	First seen	11 54 3	11 58 34
			Bisection	11 59	
9	I.	Oc. R.	Bisection	11 13	11 15
			Ext. contact	11 15	
1896. Jan. 24	I.	Oc. R.	Ext. contact	10 35	10 34
Feb. 6	II.	Ec. R.	First seen	7 48 16	7 48 3
			Bisection	7 52	
			Full?	7 54	
	IV.	Ec. R.	First seen	12 13 10	12 17 19
			Bisection?	12 18	
			Full?	12 23	
9	I.	Ec. R.	First seen	8 49 39	8 49 59
			Bisection	8 51	
			Full	8 54	
13	II.	Ec. R.	First seen	10 24	10 23 35
			Bisection?	10 25	
23	III.	Sh. I.	Bisection	6 11	
			Int. contact	6 13	6 14
	IV.	Ec. R.	First seen	6 18 52	6 22 27
			Bisection	6 24	
			Full	6 29	
	III.	Tr. E.	Bisection	6 59	7 2
			Ext. contact	7 1	
	I.	Oc. D.	Ext. contact	9 33	9 39
			Bisection	9 34	
			Just gone	9 35 30	
	III.	Sh. E.	Int. contact	9 40 30	9 54
			Bisection	9 44	
			Ext. contact	9 45 30	
24	I.	Tr. I.	Ext. contact	6 59 20	6 58
			Bisection	7 1	
			Int. contact	7 2	
Mar. 1	III.	Tr. I.	Ext. contact	6 49	6 49
			Bisection	6 51	
			Int. contact	6 54	
	III.	Sh. I.	Bisection	10 12 30	10 13
			Int. contact	10 14	
2	I.	Tr. I.	Ext. contact	8 47	8 45

June 1896.

Phenomena of Jupiter's Satellites.

491

Day of Obs. 1896.	Satellite.	Phenomenon.	Phase.	G.M.T. of Observation.			G.M.T. of <i>N. Almanac.</i>		
				h	m	s	h	m	s
			Bisection	8	48	30			
			Int. contact	8	50				
	I.	Sh. I.	Int. contact	9	40		9	37	
Mar. 8	III.	Tr. I.	Int. contact	10	25		10	19	
9	II.	Ec. R.	First seen	7	26	58	7	27	32
			Bisection ?	7	29				
			Full ?	7	30				
	I.	Tr. I.	Ext. contact	10	34	50	10	33	
			Bisection	10	36	20			
			Int. contact	10	38				
	I.	Sh. I.	Bisection	11	34		11	31	
			Int. contact	11	35	30			
12	III.	Ec. R.	First seen	7	41	31	7	41	57
			Bisection	7	46				
			Full	7	49				
16	II.	Ec. R.	First seen	10	2	20	10	2	46
			Bisection	10	5				
			Full ?	10	8				
17	I.	Oc. D.	Ext. contact	9	29	51	9	31	
			Bisection		30	46			
			Just gone		32	1			
18	I.	Tr. I.	Ext. contact	6	50	40	6	49	
			Bisection	6	52	25			
			Int. contact	6	54				
	I.	Tr. E.	Int. contact	9	7		9	9	
			Bisection	9	8	30			
			Ext. contact	9	11				
	I.	Sh. E.	Int. contact	10	8		10	15	
			Bisection	10	9	30			
			Ext. contact	10	12	45			
19	III.	Oc. R.	Bisection	7	12		7	15	
	III.	Ec. D.	Fading	8	4	30	8	9	38
			Bisection	8	6	30			
			Just gone	8	11	33			
	IV.	Sh. E.	Int. contact	8	28		8	48	
			Bisection	8	30	30			
			Quite off ?	8	35				
23	II.	Oc. D.	Ext. contact	7	28	20	7	28	
							0	0	

Day of Obs. 1896.	Satellite.	Phenomenon.	Phase.	G.M.T. of Observation. h m s	G.M.T. of <i>N. Almanac.</i> h m s
			Bisection	7 30 30	
			Just gone	7 31 50	
Mar. 30	II.	Oc. D.	Ext. contact	9 56 10	9 57
			Bisection	9 58 2	
			Just gone	5 59 10	
Apr. 2	III.	Oc. D.	Ext. contact	11 2 30	11 6
			Bisection	11 6 20	
			Just gone	11 11 20	
	I.	Ec. R.	First seen	11 13 0	11 13 14
			Bisection	11 15 30	
			Full	11 18 30	
3	I.	Tr. E.	Bisection	7 18	7 19
			Ext. contact	7 20	
	I.	Sh. E.	Int. contact	8 28 40	8 34
			Bisection	8 30 20	
8	II.	Tr. E.	Int. contact	9 35	9 43
			Bisection	9 36 30	
			Ext. contact	9 38 30	
	II.	Sh. I.	Int. contact	9 19	9 17
9	I.	Oc. D.	Ext. contact	9 32 50	9 35
			Bisection	9 34 40	
			Last seen	9 35 50	
10	I.	Tr. I.	Ext. contact	6 55 20	6 52
			Bisection	6 57	
			Int. contact	6 58 10	
	II.	Ec. R.	First seen	7 5 50	7 5 35
			Bisection	7 8	
			Full	7 10	
	I.	Sh. I.	Int. contact	8 10	8 8
	I.	Tr. E.	Int. contact	9 8	9 12
			Bisection	9 10	
			Ext. contact	9 11 30	
11	I.	Ec. R.	First seen	7 37 21	7 37 28
			Bisection	7 39	
			Full	7 41	
13	III.	Tr. E.	Bisection	8 35 30	8 39
			Ext. contact	8 39 30	
	IV.	Ec. D.	Fading	7 52	7 56 58
			Bisection	7 55	
			Last seen	7 59 40	

Day of Obs. 1896.	Satellite.	Phenomenon.	Phase.	G.M.T. of Observation. h m s	G.M.T. of <i>N. Almanac.</i> h m s
Apr. 17	II.	Ec. R.	First seen	9 40 25	9 40 31
			Bisection	9 42 30	
			Full	9 45	
18	I.	Ec. R.	First seen	9 32 50	9 32 56
			Bisection	9 34 30	
			Full	9 37	
20	III.	Tr. I.	Ext. contact	9 0 40	8 59
			Bisection	9 3 30	
			Int. contact	9 5 22	
21	IV.	Tr. E.	Int. contact	8 35	8 35
			Bisection	8 37	
			Ext. contact	8 41	
24	III.	Ec. R.	First seen	7 43 34	7 42 48
			Bisection	7 47	
			Full	7 51	
25	I.	Oc. D.	Ext. contact	7 51 30	7 53
			Bisection	7 54	
			Just gone	7 55 5	
26	I.	Tr. E.	Int. contact	7 27	7 30
			Bisection	7 29 37	
			Ext. contact	7 31	
May 3	I.	Sh. I.	Int. contact	8 24	8 21
	II.	Sh. E.	Quite off	9 20	9 26
	I.	Tr. E.	Int. contact	9 24	9 26
			Bisection	9 25	
			Ext. contact	9 26 30	
10	II.	Tr. I.	Ext. contact	6 41	6 43
			Bisection	6 43	
			Int. contact	6 45	
	I.	Tr. I.	Ext. contact	9 6	9 3
			Bisection	9 7 30	
			Int. contact	9 9	
	II.	Tr. E.	Int. contact	9 29	9 38
			Bisection	9 32	
			Ext. contact	9 34	
11	I.	Ec. R.	First seen	9 47 50	9 48 14
			Bisection	9 49 30	
			Full?	9 53	

O O 2

Notes.

Powers used, 240 and 282.

1895 Oct. 29, planet low; bad definition. Nov. 30, windy; planet low; much motion. Dec. 1, clouds; violent motion. Dec. 9, stormy; no definition. 1896 Jan. 24, windy and wet. Feb. 6, bad definition. Feb. 9, planet low; much boiling. Feb. 13, overcast sky. Feb. 23, much motion. Feb. 24, good definition. Mar. 1, stormy. Mar. 2, very stormy. Mar. 8, stormy. Mar. 9, good definition. Mar. 12, misty. Mar. 16, stormy. Mar. 17, windy; clouds. Mar. 18, good definition. Mar. 19, good. Mar. 23, much cloud. Mar. 30, much cloud. Apr. 2, clouds. Apr. 3, good. Apr. 8, good. Apr. 9, windy; cloud. Apr. 10, windy; cloud; much motion. Apr. 11, windy. Apr. 13, good. Apr. 17, fair; cloud. Apr. 18, fair. Apr. 20, good; mist. Apr. 21, good. Apr. 24, fair; in twilight. Apr. 25, bad. Apr. 26, bad. May 3, good. May 10, fair; first obs. made 1^h before sunset. May 11, fair.

The powers used were 150 when definition was bad, 240 on most occasions, and 330 and 470 when the image was very steady and the sky clear.

On certain Phenomena presented by Jupiter's Satellites and their Shadows during Transit, with a Note on the Red Spot; and on some Methods of observing the Transits of Bright and Dark Spots across the Central Meridian. By J. Gledhill.

Careful observations of the changes which the satellites and their shadows undergo while in transit across the disc of Jupiter are slowly accumulating. Among recent contributors the names of Pritchett, Trouvelot, Tebbutt, Barnard, Denning, Spitta, and Williams may be mentioned. The elaborate researches of Spitta, together with the suggestions and theories of Burton, Proctor, Schaeberle, Holden, Hough, Williams, and others, constitute a real advance in the direction of a scientific explanation of these interesting phenomena. It was with the view of widening the basis for such investigations that the following observations were made. The instrument used was the $9\frac{1}{3}$ -in. Cooke equatorial refractor, powers 240 and 270, Huyghenian, and 282 on the Simms' micrometer. The observations were begun in the early morning hours of 1895 October, and concluded in the early evenings of May of the present year.

Satellite I.

Satellite I. in transit 1896 March 2: ingress at $8^h 48\frac{1}{2}^m$; invisible about $9^h 10^m$. It passed along the bright central zone of *Jupiter*.

Satellite I. in transit, 1896 March 9: ingress at $10^h 36^m 20^s$. It traversed the bright central zone just below (to north of) the ruddy double belt, and was a bright and conspicuous object when just within the disc. At $10^h 42^m$ it was less bright, and gradually grew fainter till $10^h 55^m$, when it was just visible; it was invisible at 11^h . At $11^h 10^m$ it reappeared as a very faint